

Fig. 1

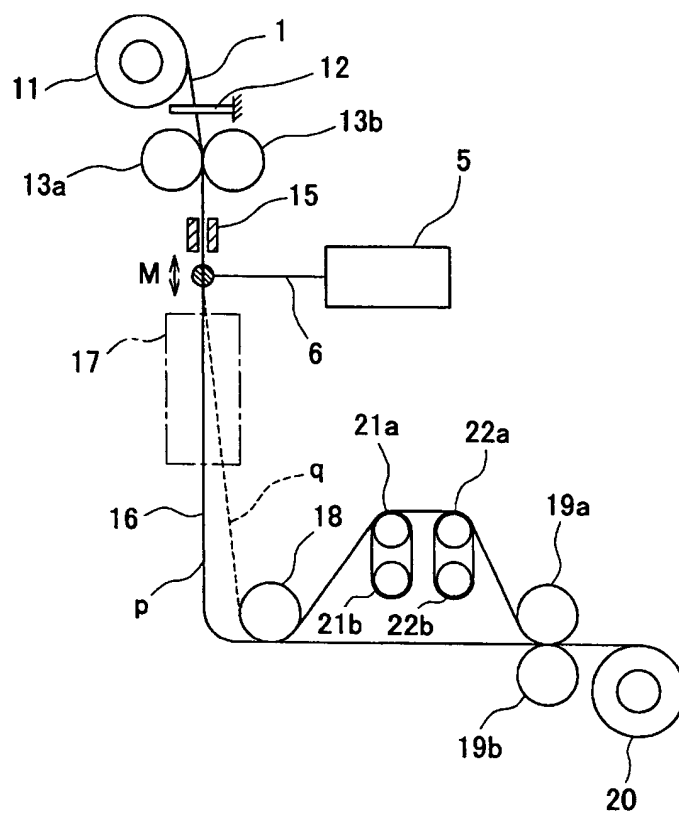


Fig. 2

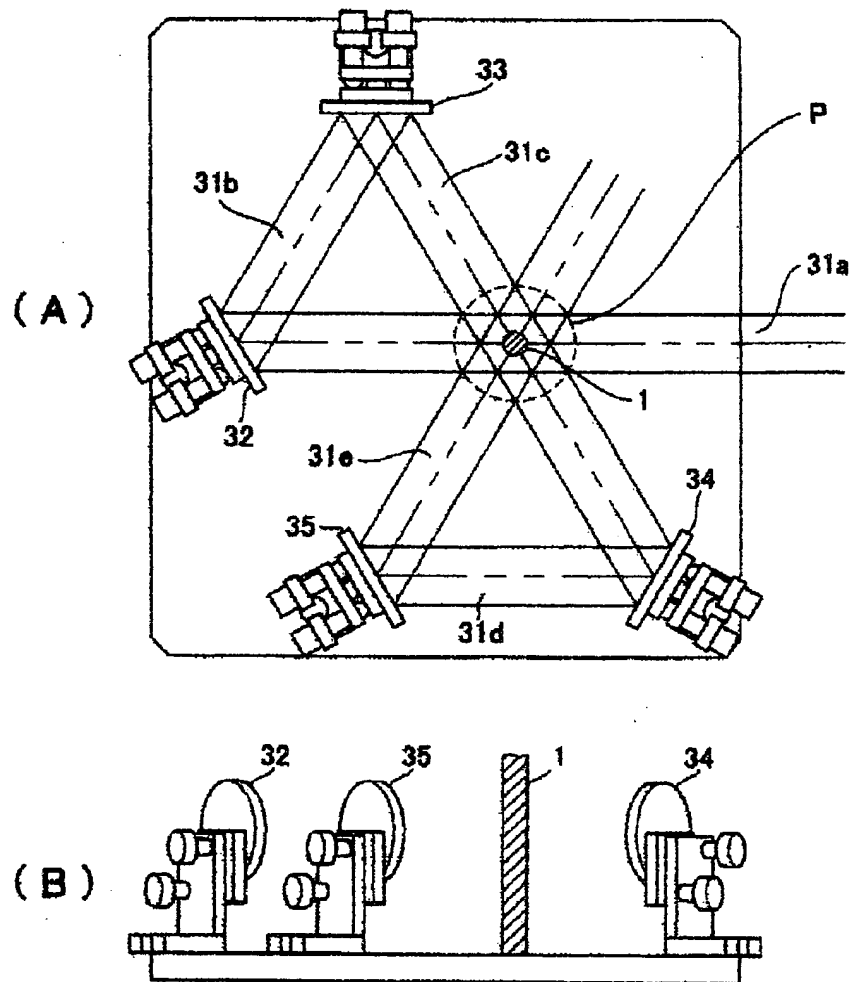


Fig. 3

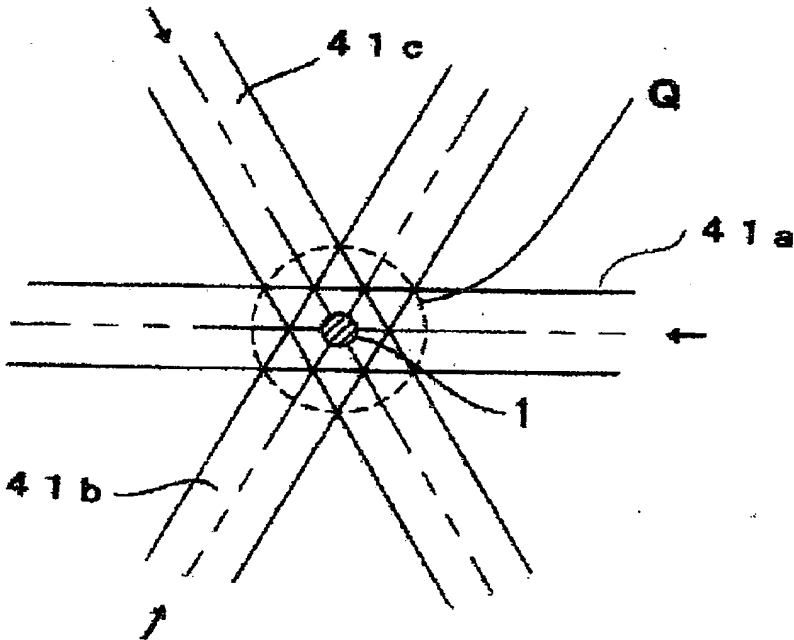


Fig. 4

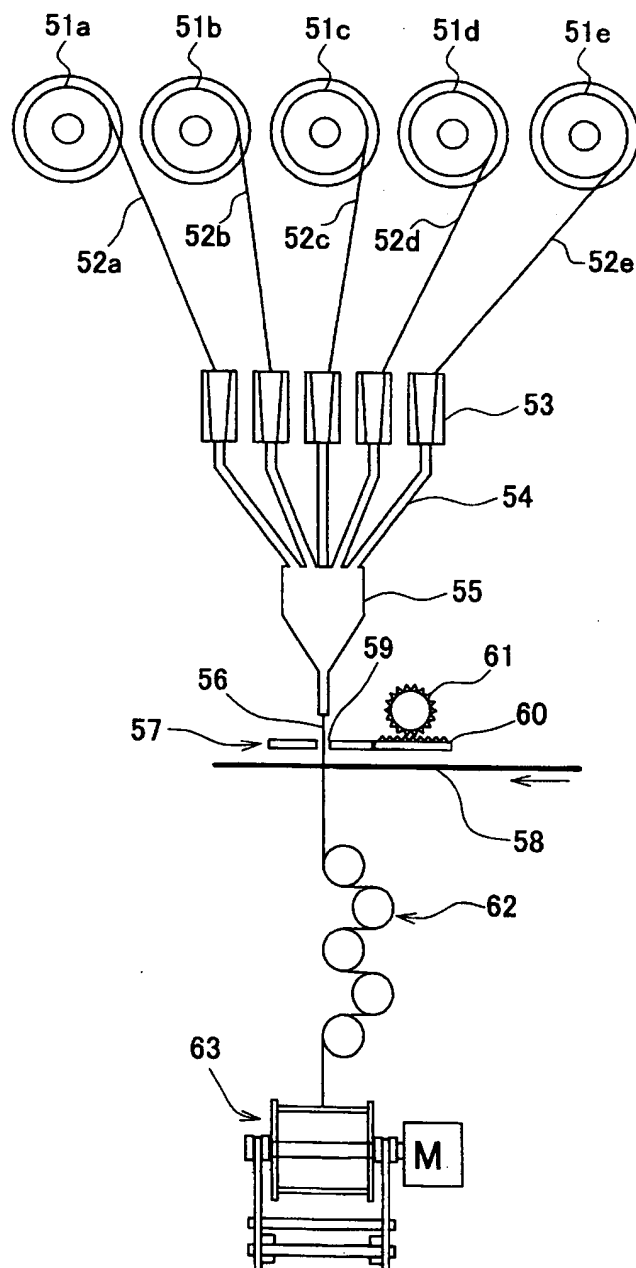


Fig. 5

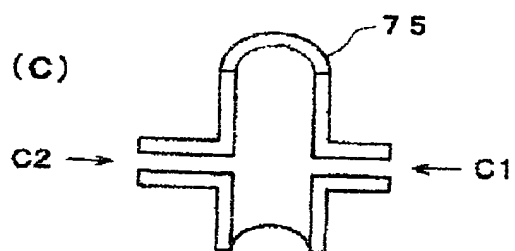
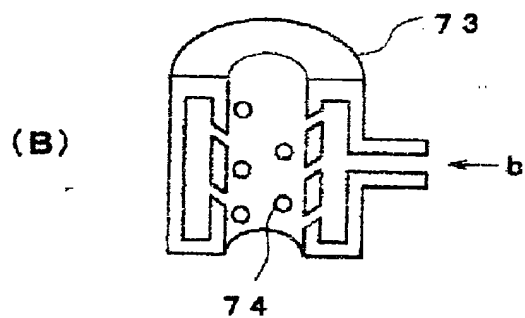
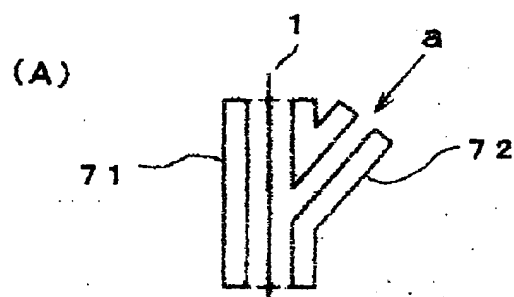


Fig. 6

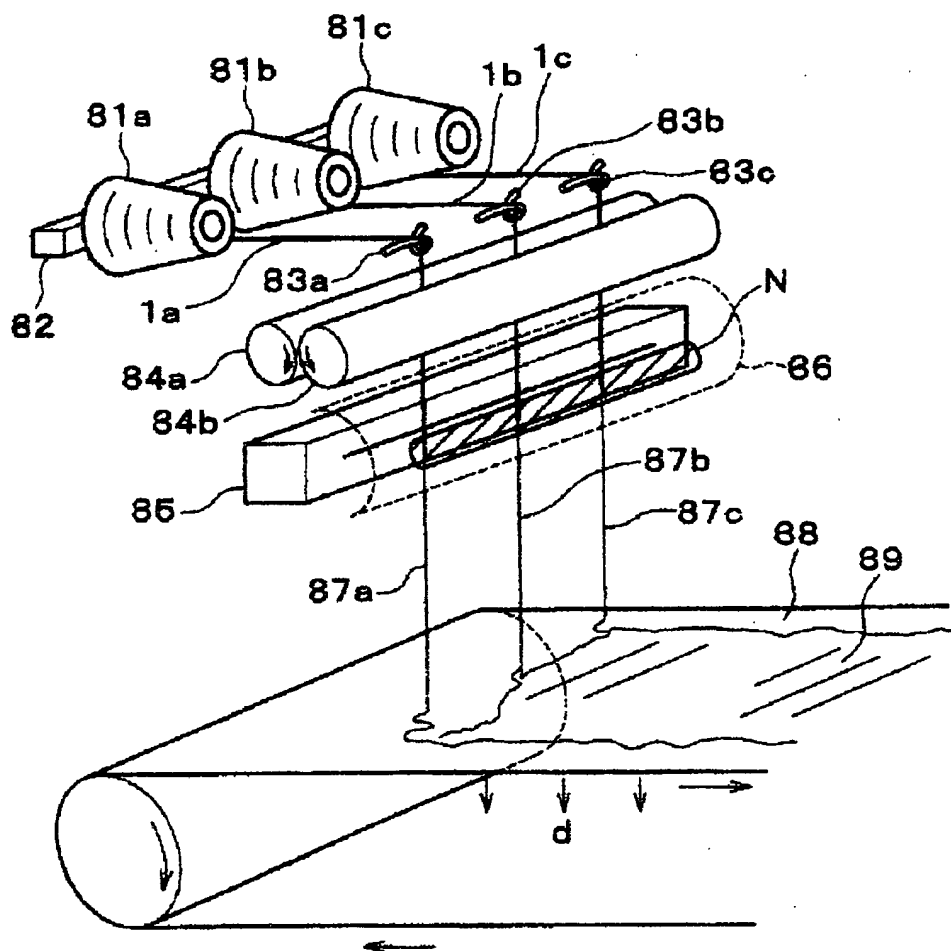


Fig. 7

Variation of diameters and birefringence by drawing of polylactic acidfilaments

Supply speed: 0.5 m/min
Watt density: 24 W/cm²

<u>Wind-up speed</u>	Filament diameter	Draw ratio	Birefringence	X-ray orientation degree	Drawing tension
m/min	μ m		$\times 10^{-3}$	%	MPa
100	5.02	223	6.89	61.8	2.5
200	3.97	357	10.26	75.2	
400	2.57	852	14.78	74.0	
600	1.75	1836	19.26	75.7	2.0
800	1.45	2675	20.29	73.4	
1200	1.45	2675	20.97		0.6
1600	1.20	3906	23.25		0.3
2000	1.20	3906	32.68		

Fig. 8

Variation of diameters and birefringence by drawing of polylactic acid
filaments

Supply speed: 0.5 m/min
Watt density: 12 W/cm²

<u>Wind-up speed</u>	Filament diameter	Draw ratio	Birefringence	Drawing tension
m/min	μ m		$\times 10^{-3}$	MPa
100	4.98	227	11.66	0.3
200	4.50	278	13.16	2.7
400	3.29	520	13.97	0.9

Fig. 9

Variation of diameters and birefringence by re-drawing and re-heat-
treatment of polylactic acid filaments

Treatment	Filament diameter	Draw ratio	Birefringence
	μ m		$\times 10^{-3}$
Laser drawing method	1.45	2674	20.29
Zone drawing method 1	1.41	2829	30.28
(Drawing Temp.: 80°C)			
Zone drawing method 2	0.60	15625	
(Drawing temp.: 80°C)			
Zone heat treatment	1.20	3906	40.63
method			
(Heat treatment temp.: 160°C)			

Fig. 10

Polyglycolic acid

Supply speed: 0.5 m/min

Filament	Wind-up speed m/min	Filament diameter μ m	Draw ratio	Birefringence $\times 10^{-3}$
Drawn filament	100	9.4	77	6.4
	300	5.7	208	7.0
	500	3.9	445	8.0
	700	3.3	427	11.3
	900	3.1	621	15.8
	1100	2.6	1025	17.5
	1300	2.3	1280	22.1
	1500	2.3	1280	27.0
	1700	2.2	1350	27.9

Fig. 11

Polyglycolic acid

Supply speed: 0.5 m/min

Filament	Wind-up speed m/min	Filament diameter μ m	Draw ratio	Birefringence $\times 10^{-3}$
Drawn filament	100	16.0	167	5.3
	300	8.6	580	16.9
	500	5.1	1647	26.1